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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/050,866

01/18/2002

Kiyoshi Yoshizumi

218209US3

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07/15/2008

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EXAMINER

HODGE, ROBERT W

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

07/15/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/050,866	Applicant(s) YOSHIZUMI ET AL.	
	Examiner ROBERT HODGE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,8-18,20,32-41,46-49,51 and 52 is/are pending in the application.
- 4a) Of the above claim(s) 2-4,9,10,16-18,20,32-36,40,41 and 46-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8,11-15,37-39,51 and 52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/6/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/6/08 has been entered.

Response to Arguments

Applicant's arguments, see Remarks, filed 6/6/08, with respect to the rejection of claim 12 under 35 U.S.C. 112, first paragraph have been fully considered and are persuasive. The rejection of claim 12 under 35 U.S.C. 112, first paragraph has been withdrawn.

The remainder of applicant's arguments filed 6/6/08 have been fully considered but they are not persuasive. Regarding the amendment to claim 1 adding the functional limitation that the valve is controlled to open and close at an intended time. It should be noted that non-return valves (i.e. check valves) are designed to open when a certain pressure is exceeded on the upstream side of the valve and to close when the pressure falls below the designed pressure set point. Therefore check valves inherently open and close at intended times (i.e. when a pressure is exceeded or falls below a set point value) and because this is the purpose of their design they are "controlled" to operate

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this way. Furthermore applicants are directed to MPEP 2114 regarding functional language.

2114 [R-1] Apparatus and Article Claims — Functional Language

For a discussion of case law which provides guidance in interpreting the functional portion of means-plus-function limitations see MPEP § 2181 - § 2186.

APPARATUS CLAIMS MUST BE STRUCTUR-ALLY DISTINGUISHABLE FROM THE PRIOR ART

>While features of an apparatus may be recited either structurally or functionally, claims< directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. >*In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< *In re Danyl*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). “[A]pparatus claims cover what a device *is*, not what a device *does*.” *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

MANNER OF OPERATING THE DEVICE DOES NOT DIFFERENTIATE APPARATUS CLAIM FROM THE PRIOR ART

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) (The preamble of claim 1 recited that the apparatus was “for mixing flowing developer material” and the body of the claim recited “means for mixing ..., said mixing means being stationary and completely submerged in the developer material”. The claim was rejected over a reference which taught all the structural limitations of the claim for the intended use of mixing flowing developer. However, the mixer was only partially submerged in the developer material. The Board held that the amount of submersion is immaterial to the structure of the mixer and thus the claim was properly rejected.).

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Regarding the newly added claims, they will be addressed in the grounds of rejection below.

In response to applicant's argument that the mixing portion of Boneberg must supply a burner for heating a reformer would receive substantially no hydrogen gas from the burner if connected to the anode circuit of Joerissen and so such a combination would have no utility, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). It should be noted that applicants are not claiming a method applicants are claiming an apparatus and therefore the amount of hydrogen that would be provided from Joerissen to a mixing portion that would be added from Boneberg is not relevant, it is whether the combination provides the same structure of the instant claimed invention and whether a person having ordinary skill in the art would find said combination to be obvious. As has been pointed out in the grounds of rejection it is the position of the Examiner that said combination would in fact be obvious to one having ordinary skill in the art in order to provide a spent gas mixture that could be catalytically combusted to fully utilize the reactant gases for heating the system as needed and therefore not wasting any reactant gases by venting them to the atmosphere.

Regarding claim 13 applicants' arguments are not commensurate in scope with the claim. Claim 13 recites that the "control portion comprises means for opening and closing the valve at intervals of relatively short period when delivering the discharged off

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gas to the mixing portion”, by said disclosure the Examiner is only required to find an equivalent structural feature that is capable of opening and closing the valve at certain intervals, said intervals not being specifically defined by the claim. As has already been addressed in the previous office actions “Joerissen et al. also teaches a Programmable Logic Controller 14 that controls the valves and pumps of the system based on input received from the entire system such as cell voltage and temperature which then controls all of the fluid flow streams based on said input by either operating pumps and/or valves that are opened and closed at regular intervals and also according to other factors such as concentration which can be determined indirectly from at least cell voltage”, that means that Joerissen is not only capable of opening and closing the valve at generic intervals, Joerissen is actually opening and closing the valve at intervals responsive to inputs received from the system which reads on the generic interval of claim 13.

Therefore the previous prior art rejections will be maintained.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 52 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recitation of “a mixing portion which is connected to receive only the discharged hydrogen-off gas and the discharged oxygen-off gas from the first and second flow passages respectively and in which the only oxygen-off gas may be mixed with the hydrogen-off gas” is new matter. Applicants should be well aware that as disclosed in the instant specification air is being fed into the fuel cell at the cathode inlet and air comprises more than just oxygen, such as nitrogen, carbon dioxide, carbon monoxide, sulfur dioxide and many other gaseous constituents. Therefore contrary to the recitation in claim 52, more than oxygen-off gas is being supplied to the mixing portion and said recitation limiting only oxygen-off gas being fed to the mixing portion from the second flow passage is new matter. For purposes of Examining as long as the prior art teaches only the exhaust gases of the anode and cathode being fed to a mixing device in one embodiment, it will read on claim 52 as recited.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by GB 2242563 (provided by applicants in the IDS submitted 7/27/07 with the statement stating that the UK publication is the readily available English translation of the cited non-English language reference which is DE 3537527) hereinafter referred to as Citation 6.

According to the provided English translation of the German office action:

4. Lack of novelty of claim 1 (§ 21 (1) No. 4 German Patent Act in connection with § 3 German Patent Act)

As regard the structuring of the features it is referred to paragraph 1 of the present submission.

Citation 6 discloses:

- 1.1. a fuel cell system (summary),
- 1.2. installed onboard of a vehicle (summary: submarine)
- 1.3. and having a hydrogen fuel cell releasing hydrogen-off gas and oxygen-off gas (summary).
- 1.4. The fuel cell system according to citation 6 further exhibits a first flow passage which leads from a hydrogen-off gas exhaust port of the fuel cell and through which the discharged hydrogen-off gas flows (passage (51) in fig. 2),
- 1.5. and a second flow passage which leads from an oxygen-off gas exhaust port of the fuel cell and through which the discharged oxygen-off gas flows (passages (52, 55) in fig. 2).
- 1.6. Further, a mixing portion is provided, which introduces and mixes the discharged hydrogen-off gas from the first passage and the discharged oxygen-off gas from the second flow passage, (combination site of the passages (51) and (58) between the valves (73) in fig. 3).
- 1.7. Further, a third flow passage is provided, which leads from the mixing portion and passing to the atmosphere by the mixing gas (passages between the combination site of passage (51) and (58) between the valves (73) and (including) valve (79) in fig. 3).
- 1.8. A valve is disposed in the first flow passage (valve (73) in passage (51) in fig. 3),
- 1.9. being an open/close valve (holding valve (73), column 11, line 35).

Thus, citation 6 discloses all features of claim 1. Therefore, claim 1 is not new.

In the above citations column 11, line 35 corresponds to page 17, line 6 of the GB reference, the rest of the citations are correctly identified. Therefore as stated above Citation 6 anticipates claim 1. As was stated above in the Response to Argument section; it should be noted that non-return valves (i.e. check valves) are designed to open when a certain pressure is exceeded on the upstream side of the valve and to close when the pressure falls below the designed pressure set point. Therefore check valves inherently open and close at intended times (i.e. when a pressure is exceeded or falls below a set point value) and because this is the purpose of their design they are “controlled” to operate this way.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 8, 11-15 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/63993 hereinafter Joerissen et al. in view of U.S. Patent No. 6,696,188 hereinafter Boneberg et al.

Through the provided translation of WO 00/63993 Joerissen et al. teaches a fuel cell unit 7 that utilizes a metal hydride hydrogen storage device 19 to provide hydrogen to the anode chamber 2 by means of a passage provided with a pressure reduction valve 24. The anode chamber outlet of the fuel cell provides a passage for unreacted hydrogen to be recycled to the anode chamber inlet by means of a pump 9 or exhausted to the atmosphere via a further passage with a valve 7, each of the exhaust

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passages for discharging anode and cathode off-gas are provided with condensed water separators 8a and 8b, wherein water separator 8a (i.e. flow-rate reducing portion) inherently reduces the flow rate of the exiting anode exhaust and also includes an inherent buffer (i.e. storage of water and an area where the water is separated from the gas). Joerissen et al. also teaches a Programmable Logic Controller 14 that controls the valves and pumps of the system based on input received from the entire system such as cell voltage and temperature which then controls all of the fluid flow streams based on said input by either operating pumps and/or valves that are opened and closed at regular intervals and also according to other factors such as concentration which can be determined indirectly from at least cell voltage. Joerissen et al. further teaches a pump 11 (i.e. pressure changing device) in the oxidant inlet stream for the fuel cell to provide oxidant to the fuel cell (see the whole translation of Joerissen, now provided). The Examiner notes that applicants have elected the species of figure 6 and there is only support for a pressure changing device in the seventh flow passage, which is known as the oxidant inlet stream, there is no support in figure 6 for a pressure changing device in the second flow passage, which is known as the oxygen-off gas stream and therefore the limitation of "a flow rate-changing device which is disposed in the second flow passage" has been withdrawn from consideration from claims 11 and 12.

Further clarifying Joerissen for newly presented claim 51 as well as previously presented claim 8, Joerissen teaches in figure 1 that the hydrogen off gas from the fuel

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cell may circulate back to the fuel cell (i.e. a recycle loop is provided from the hydrogen exhaust passage to the hydrogen inlet passage of the fuel cell).

Joerissen does not teach a mixing portion that mixes the anode and cathode exhaust gases.

Boneberg et al. teaches a fuel cell system being supplied with hydrogen and oxygen gases, which in turn generates electric power (column 3, lines 10-15) then mixing the exhaust gas streams from a fuel cell (figure 1 and column 5, lines 1-3) and combusting the mixture catalytically (column 2, line 15 and column 4, line 2) and then venting the combustion product to the atmosphere thus having a reduced hydrogen content (figure 1 and column 5, line 3).

At the time of the invention it would have been obvious to one having ordinary skill in the art to include a mixing portion at the anode and cathode exhaust ports of Joerissen as taught by Boneberg in order to provide a spent gas mixture that could be catalytically combusted to fully utilize the reactant gases for heating the system as needed and therefore not wasting any reactant gases by venting them to the atmosphere.

Regarding claim 52 Boneberg teaches that during normal operation of the fuel cell only the exhaust gases from the anode and cathode exhaust streams of the fuel cell are fed to the mixing portion (column 3, lines 32-45).

Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joerissen et al. in view of Boneberg et al. as applied to claim 14 above, and further in view of U.S. Patent No. 2,850,038 hereinafter Shabaker.

Joerissen et al. as modified by Boneberg et al. does not teach any properties of the flow-rate reducing portion.

Shabaker teaches a flow control device for gaseous material employing variable diameter orifices that can in particular be smaller or larger depending on the control conditions (column 1, lines 15-21 and column 4, lines 3-60).

Joerissen et al. as modified by Boneberg et al. and Shabaker are analogous art because they are from similar problem solving area of controlling the flow of gases.

At the time of the invention it would have been obvious to one having ordinary skill in the art to include different diameter orifices as well as changing the volume of the flow rate reducing device (i.e. water separator) of Joerissen et al. as taught by Shabaker in order to properly remove all of the water from the anode exhaust so that it can be reused for humidification and cooling thereby optimally operating the system, because for example if the flow is too fast not enough water will be removed for reuse in the system and if the flow is too slow the system would get backed up and potentially flood the anode chamber thus rendering the fuel cell useless.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HODGE whose telephone number is (571)272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Hodge/
Examiner, Art Unit 1795